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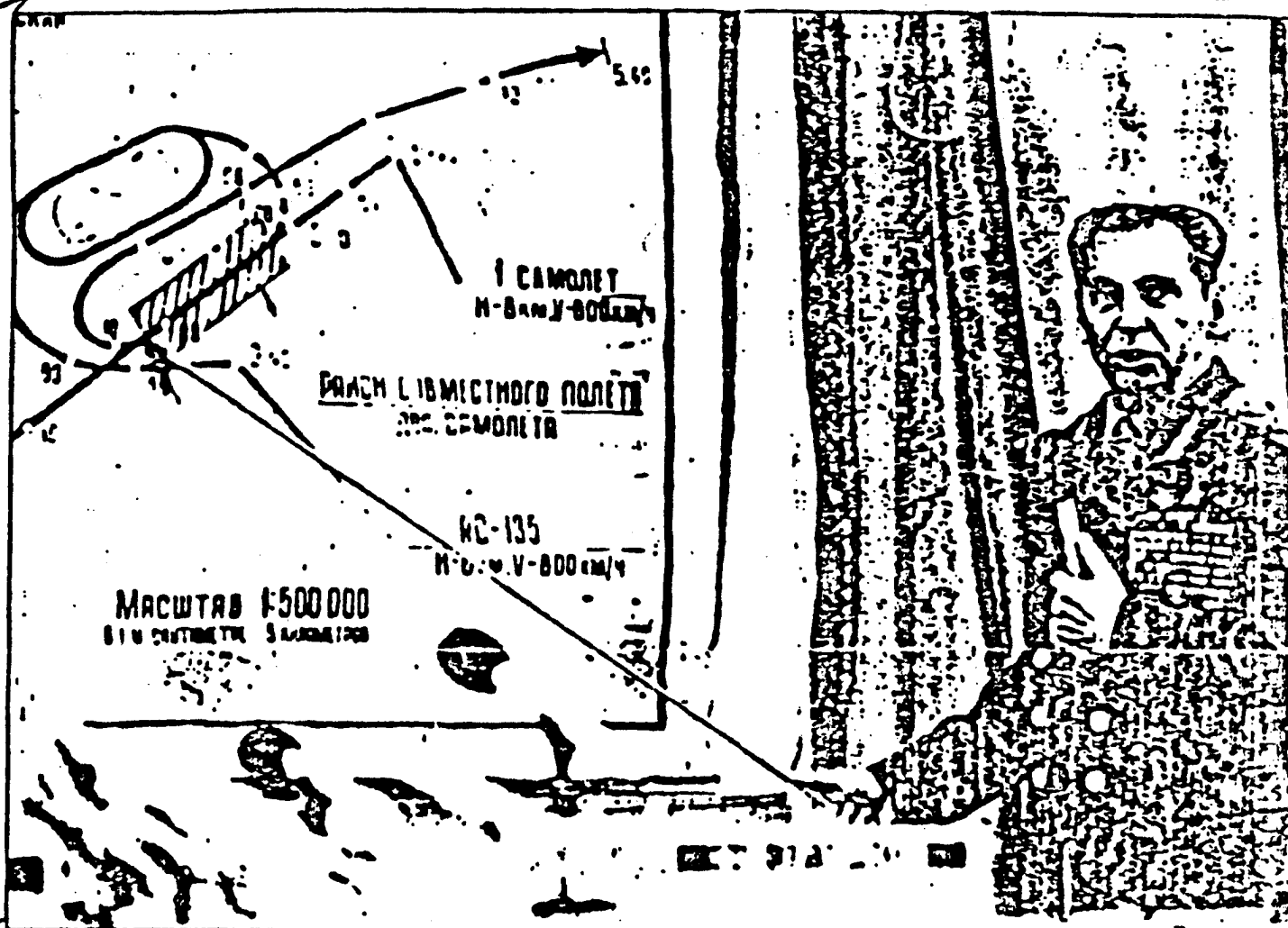
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Now the Approved For Release 2008/10/16 : CIA-RDP90B01370R000801140022-4  
 Airliner flight KAL 007 with the loss of 207 lives have surfaced, it may be appropriate to commence a dispassionate analysis of the horrific incident. The aim of this appraisal is purely to try and understand what might have happened, and the method is to introduce some new and hitherto unpublished perspectives. The editor does not necessarily agree with all the author's views, and, indeed, this magazine has already stated that it did not believe that KAL 007 had a "spy" mission, but the fresh material adduced here gives much to ponder. Yet in public at least, apart from occasional snide remarks, the superpowers seem to have dropped the issue, even though many questions concerned with the

article have not been asked before, let alone resolved. Defence Attaché has therefore decided to publish this disturbing review of the facts in the hope that it will inspire further investigation. Scientific inquiry is needed, not name-calling and mud-slinging.

The author, who for professional reasons must remain anonymous is well known to the editor and is willing to enter into correspondence on any of the issues raised here or to supply further background. Letters addressed c/o The Editor will be forwarded by Defence Attaché, which reserves the right to publish extracts.

## Reassessing the Sakhalin incident

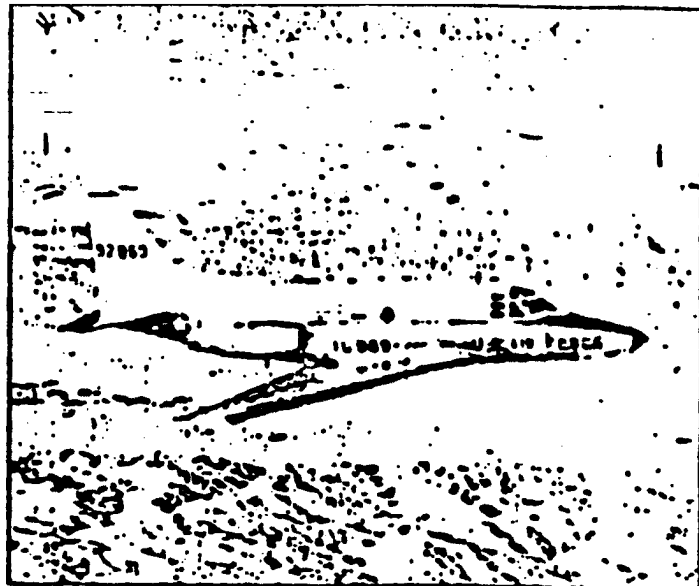
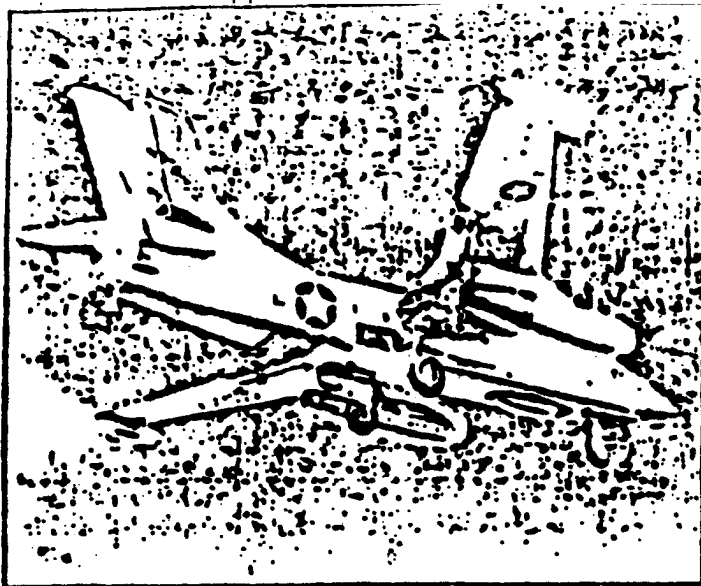


Soviet Chief of Staff Marshal Nikolai Ogarkov indicates the coincident flight of KAL 007 and the KC-135, at the same height and speed, some 200-250mi from Soviet territory — ie towards maximum range for ground-based radar. Map time 5.00 shown for commencement equals 16.00 GMT. At 16.10 the KC-135 turned back. KAL 007 made the first Soviet landfall at 16.30

IN MAY 1960 a U-2 reconnaissance aircraft piloted by Gary Powers was brought down in the vicinity of Sverdlovsk in the Soviet Union. This event not only demolished the Paris Summit Meeting between Eisenhower and Khrushchev, but signalled the end of the ability to use aircraft for reconnaissance purposes over the USSR. This function could now only be performed by satellite, but at the time of the U-2's destruction no payload had ever been returned from space. Discoverer was the name of the US programme dedicated to developing the capability for photographic reconnaissance from earth orbit, with the return of a film-containing capsule. The first recovery was achieved with

Discoverer 13, launched 9 August 1960. By 1963/1964 the US had attained an advanced operational capability with photographic reconnaissance satellites and had put them to sophisticated tactical use.

It would have been surprising if, during the period when photo-reconnaissance (PR) satellite techniques were completing their development — a process which was fairly obvious to any interested student — corresponding efforts had not been made to develop electronic intelligence, or ELINT satellites, universally known as Ferrets. In fact, Ferrets came along only a couple of years behind their PR counterparts, although for various reasons electr



*Incidents involving a T-39 (above right) and an RH-66 (above left) occurred in 1964: could they have been linked to a spy satellite?*

intelligence operations have been kept much more clandestine and are far less well understood by the general public. Had it not been so, the introduction of ELINT techniques from orbit would have been seen to be quite as dramatically marked as the exit of the reconnaissance aircraft. The time was 1964, four years after the stunning down of the U-2.

### Eavesdropping

The orbital characteristics of Ferret-type satellites are well understood, and the reader may be referred to the excellent article *US Reconnaissance Satellite Programmes* by Anthony Kenden in the magazine *Spaceflight*, published by the British Interplanetary Society, issue dated July 7, 1978. To quote briefly from this article: "Their mission is to pick up and record radio and radar transmissions while they are over foreign territory, for later replay back to ground stations at home for analysis. In this way it is possible to locate the enemy's aircraft and missile defence radars, and deduce a good deal about their characteristics and performance, to eavesdrop on military and government communications . . . This knowledge gives a great insight into the offensive and defensive threats posed by the opposition, and into his strategy and future plans". Similarly, "Principles of Electronic Warfare", by R.J. Schlesinger et al., published at the beginning of 1962, a couple of years before Ferret satellites made their operational debut, described another relevant aspect of Electronic Reconnaissance: "Another procedure for gaining information . . . would be to activate elements of a nation's defense intentionally and carefully observe the ensuing activity. This stratagem could be accomplished by directing an aircraft, or flight of aircraft, to approach the early-warning radars of the enemy's defense system. How deep the penetration would be allowed to progress is a matter of conjecture and policy . . . These procedures are both militarily and politically dangerous and are not generally subscribed to by major powers in time of peace."

On January 19 1964 a satellite was launched from Vandenberg Air Force Base in California, of undisclosed identity, which was recognized as having the orbital characteristics likely to be associated with Ferrets. Its course

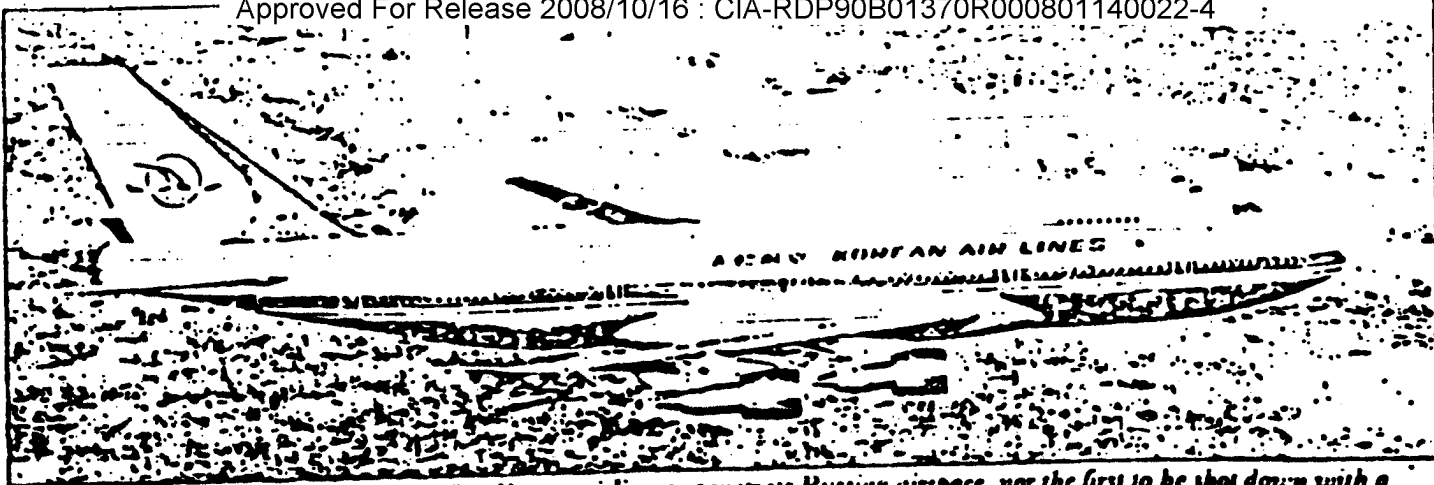
launch of the satellite — a United States Air Force T-39 jet trainer flew into East German airspace near Diedorf and after penetrating some 100km was shot down by a Soviet fighter with the consequent deaths of all three crew members, precipitating a major diplomatic confrontation between the USA and the USSR. The US described the incident as "a careless and inexcusable act of violence against an aircraft which had strayed accidentally over the demarcation line between East and West Germany." The Soviet Embassy in Washington however refused to accept the American protest note, saying there was every reason to believe the flight was not in error.

From the information published by both sides it was possible to trace the route flown by the T-39 during the penetration with considerable accuracy, and to establish that penetration of East German airspace began at 13.55 GMT and terminated with the destruction of the plane at about 14.02, ie seven minutes later. Where, over the entire globe, was the suspect Ferret satellite at this time?

Climbing rapidly towards a high point on the Western horizon, as viewed from the area of penetration, is the answer. It was in fact on a northbound course taking it across, Western France and the British Isles, and at its highest point in the sky it would have been at about 40° elevation. In other words it would have been in optimum position to record radar activity directed from the East towards the intruder. Would have been, rather than was, for the optimum position would have been reached between about 14.04 and 14.05, roughly over the Channel, and the aircraft had been shot down about 2½ minutes earlier. So rapid was the transit of the satellite that at this earlier time it had yet to cross the Pyrenees, and was only just entering the zone where Soviet radar transmissions might be intercepted. It might therefore seem that the penetration had been expected to last a few minutes longer, and had been cut short before its military value could be maximized.

Whatever other conclusions might be drawn, the possibility of all this happening by sheer coincidence appeared calculably remote — about 200 to 1 against in terms of the satellite being where it was by chance.

While the Soviet Union clearly believed the incident to be deliberate, it did not say anything about the satellite involvement (indeed to the writer's knowledge, nothing has



KAL 747: flight KAL 007 was not the first Korean airliner to penetrate Russian airspace, nor the first to be shot down with a missile

At the time, Western observers considered the United States entitled to proceed in this way with military aircraft and aircrews, if it so wished. Nor was the Soviet Union to be blamed for reacting as it had. (Of course, the Soviet Union may genuinely not have related the satellite to the intrusion, or alternatively it may have been cunning enough not to say so. Subsequent events demonstrated that the US decided that the Soviet Union had genuinely not been aware of the satellite; for, having come to this conclusion, the US would assume it retained the option of exploiting the satellite again. Now a characteristic of the Ferret-type orbit is that it appears very stable: the satellite continues to pass at about the same local time in the same region. Looking at this particular satellite, it could be calculated that at intervals of several days it would return almost exactly over its previous track. For example, on January 28 1964 it had crossed the 50°N parallel (a convenient reference) at 2½°W, and on March 10 — 42 days later — it would cross at 2°W at almost the same time of day. Imagine then the shattering effect of the news on March 10, that another USAF aircraft (this time an RB-66 twin-jet reconnaissance aircraft, had flown into East German airspace, only some 50 miles north of the previous intrusion, and at almost the same time, to be shot down even more promptly. This time the crew of three parachuted to safety — perhaps they were better prepared. It is a significant point. The Soviet Union, however, finessed by not immediately disclosing the fact that they had survived.

### Navigational errors

This time the diplomatic developments followed a different path. The Soviet Union had previously demanded that measures should be taken to prevent a repetition of the January 28 incident. Manifestly, the US had failed to do so and it did not have a diplomatic leg to stand on. Amidst renewed protestations of navigational errors and instrument failures, the crew returned to a publicly announced climate of disgrace, which was also shared by the commander of the 10th Tactical Reconnaissance Wing to which they belonged.

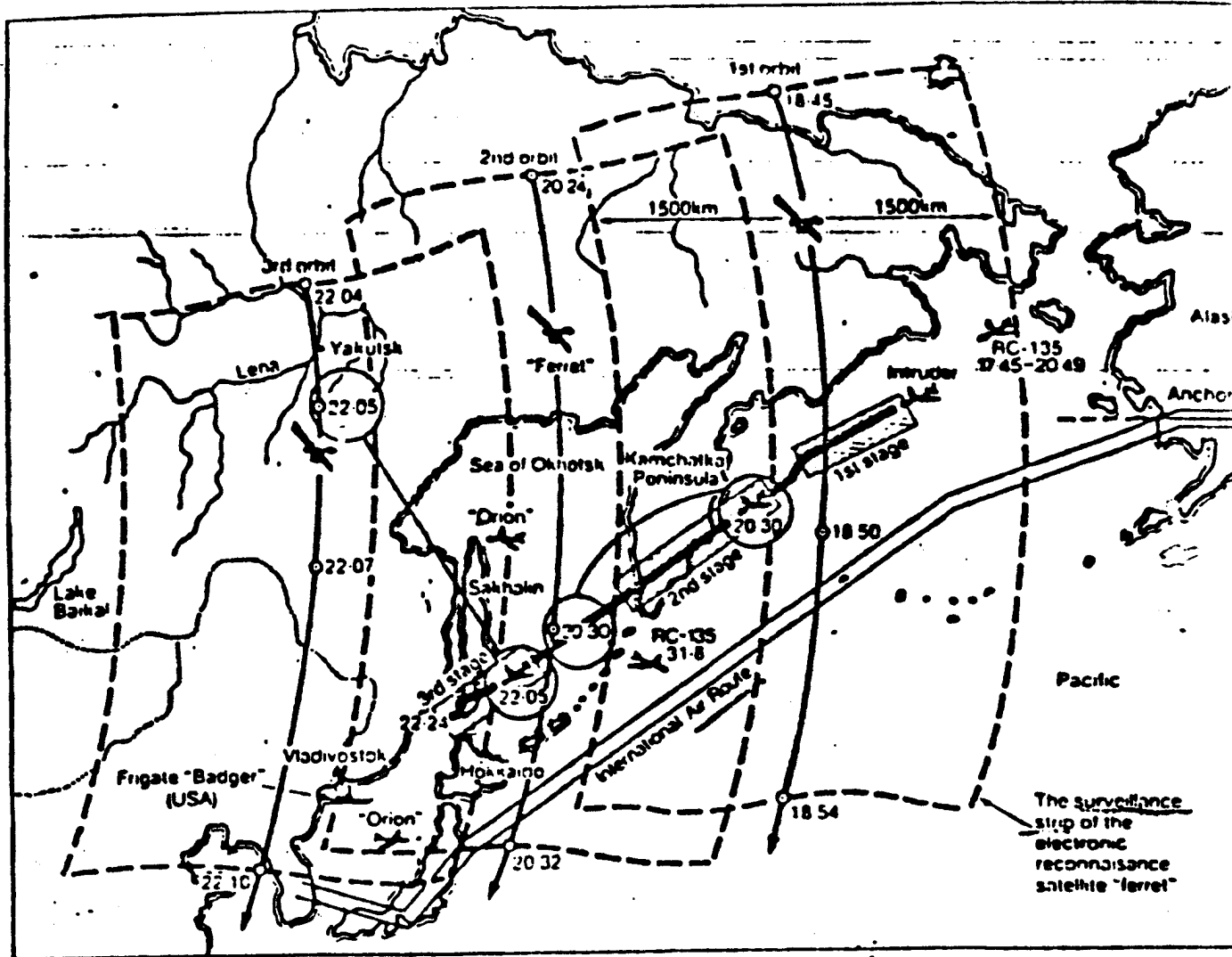
As the years went by, these two closely-timed incidents began to stand clearly alone in the historical perspective. There had been nothing like them before and there was nothing like them again. The season for navigational errors and instrument failures was over, at least, any which had such dire results. Until, that is, the night of August 31/September 1, 1983. South Korean Airlines Flight 007, a

prolonged navigational deviation, ultimately flying a course approximately parallel to but 500km to the west of the international airway it should have been on, while, according to the detailed report in *The Sunday Times* of 4 September, still reporting positions as if it were flying along the airway. It penetrated Soviet airspace for the first time over Kamchatka, emerged to cross the Sea of Okhotsk, then penetrated for the second time, an hour and thirty-five minutes later, over Southern Sakhalin, where it was shot down.

The Soviet Union eventually published an extended analysis of the incident in *Pravda* 20 September, over the name of Marshall Kirsanov. This analysis described a large-scale intelligence operation allegedly orchestrated by the US. The central feature was identified as co-ordination between the movement of the Korean airliner and repeated passes by a US Ferret-D satellite. This ELINT satellite made, it was claimed, three operational passes. The first came well before the airliner approached Soviet territory, and had the purpose of recording Soviet radar and electronic emissions at routine military level. The second was accurate to the minute as the airliner made its first Soviet landfall, creating an "alert" situation in which the intensity of electronic emissions was approximately doubled. The third pass was equally accurately timed as the airliner made its second landfall.

Little attention has been paid in the West to this account, probably because the general public does not in the least understand the techniques of electronic warfare and so is hardly able to follow the argument, but in the light of the 1964 incidents it is entirely consistent. The only difference is the much higher level of sophistication employed in 1983, providing the comparative initial and later monitoring of Soviet military electronic activity, two successive intrusions and, according to the *Pravda* article, the involvement of several US military aircraft and at least one naval vessel, the frigate *Budger*. While in all the circumstances it is entirely credible that the Soviet account has been ignored, it seems fair to say that knowledge of the earlier incidents had been available, the reaction might have been different.

If we accept that the 1964 incidents, seen in retrospect, tend to validate the Soviet account, can we then look deeper into the matter and identify any further relevant factor not so far revealed by either the US or the Soviet Union? Indeed we can, but first there are some points to note about the emerging story of Flight 007. One is that the Ferret satellite had departed below the effective horizon at 19.21. So in



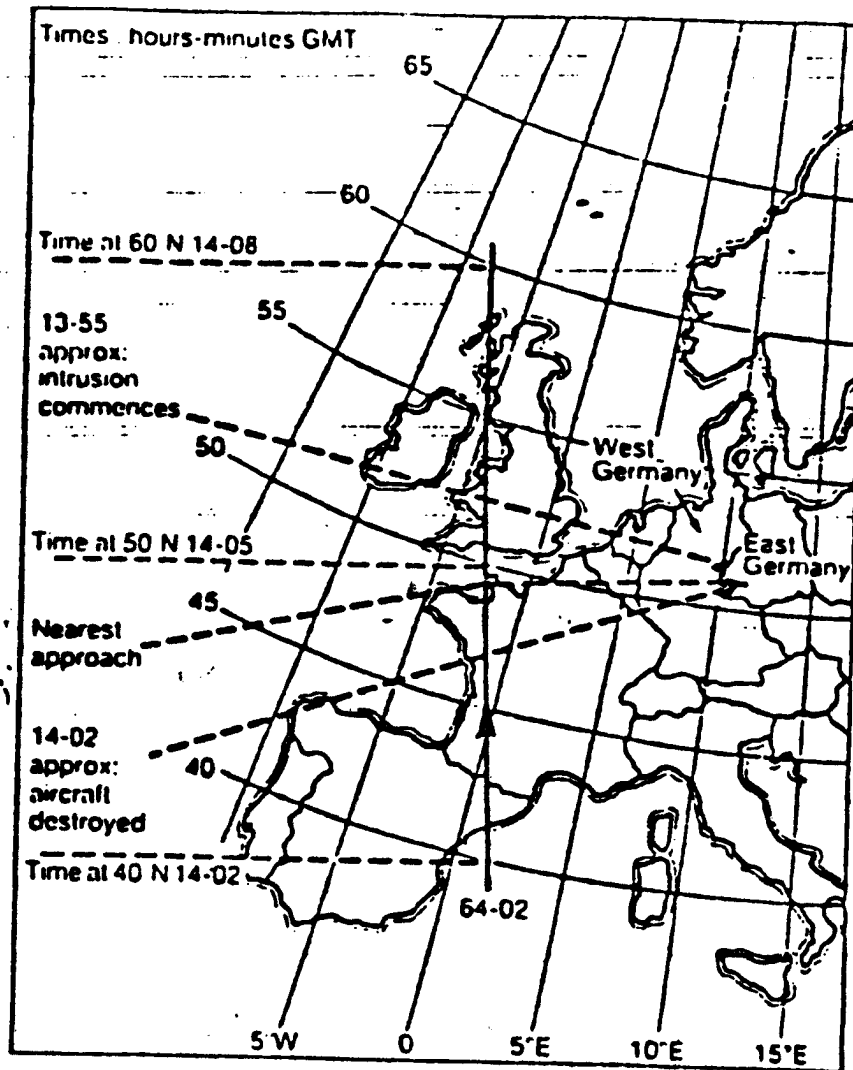
that respect the intelligence operation had probably been completed. The Soviet Union, in interrupting the flight, left matters to the last possible moment. This is by contrast with the 1964 incidents when the reaction was so prompt that it must be doubted whether any worthwhile military results could have been obtained. Of course, on these occasions the intruding aircraft were clearly military and there would have been no compunction about shooting them down if they failed promptly to obey signals to land. If US intelligence services planned the Korean incident, they would have been in no doubt that they could not achieve their aims with a military aircraft. Equally, they would not achieve their aims with a manifestly civilian aircraft, because a manifestly civilian aircraft would not have the effect of turning on all manner of military radars and electronics. They would need to offer an aircraft of initially apparently military character, which would turn out later to be apparently civilian. This would be the explanation for the co-incident flight of KAL 007 with a US military aircraft of similar profile, an RC-135, within range of Soviet radars, less than half an hour before the first Soviet landfall. It was a dummy-selling tactic, creating the possibility that a military aircraft was flying in to cross the borders of the Soviet Union. Subsequent identification as a civilian aircraft would offer protection against the otherwise imminent attack. For the first intrusion, the Soviet Union gave it the benefit of the doubt; it does not seem in any case to have been over a highly sensitive area; but when it made a second

have concluded that the US would not hazard a general civilian aircraft in this way, that it was a specially prepared intelligence aircraft, and that provision would have been made for whatever crew members were on board to be rescued by parachute in case of emergency, as had happened in the second of the 1964 incidents. This is not an argument to exonerate the Soviet Union, it is a technical point for consideration.

Why did these events, widely separated in time, showing continuity and development of technology, happen when they did? In the case of the 1964 incident the answer seems clear: what triggered them was the availability of a new technology of electronic intelligence gathering by satellite. And after the disastrously ambitious start, Ferrets settled down for their routine operations for many years without raising further diplomatic storms. What happened to disturb this state of affairs? If, before, the essence of the matter was the use of new technology, would one be correct in suspecting that the technology again? What new technology?

An article in *Spaceflight*, May 1982, "The Military in the Shuttle", by Gerald L. Borrowman, makes a point which should surprise no-one, namely that the Department of Defense has a major role in the utilization of the Space Shuttle, as no doubt its counterpart in the Soviet Union has in the utilization of Soviet manned spacecraft. The article quotes from statements made to the Appropriations Defense Subcommittee. Former

4 Ferret satellite diagram produced by the Soviet Union after the KAL 007 shoot-down in September 1983, published in Pravda. Times shown correct to GMT by deduction of four hours



Ferret satellite diagram produced by Western observer group at the time of the first shoot-down incident, hitherto unpublished. Date January 28, 1964. Diagram shows that the aircraft (a T-39 jet trainer) was destroyed at 14.02 GMT, while the satellite was still over the Mediterranean. The satellite (designated 64-02) made its closest approach to the incident area three minutes later, and was then about 40° elevation above the horizon

that the information includes judgements by people the President directly trusts." Lt. Gen. Thomas Stafford indicated that "The main thing that space will evolve is, to start with, command and control communications. Today we have our operation/command authorities, a Boeing 747 and a KC-135 that the SAC Commander has. Down the road, I can see that this National Command Authority might be delegated to somebody in space . . . (such a command post) could still utilize relay satellites very effectively as far as command of all your forces and resources. So I can see command, control and communications being the first step as far as the military applications." Evidently a military command and control post in orbit is a natural and legitimate goal of Shuttle development.

Where was the Shuttle on August 31/1 September? On 30 August, Mission STS-8 had lifted off from Cape Canaveral at 06.32 GMT, that is 36 hours before the Korean airliner reached the final tragic minutes of its flight. The Shuttle was launched eastwards at the unusual local time of 02.32, the first night-time launch, into an orbit at  $28\frac{1}{2}^\circ$  inclination. It would not fly over the Soviet Union, nor directly over the area where the incident was destined to take place — which was between  $45^\circ$  and  $55^\circ$ N compared with  $28\frac{1}{2}^\circ$  as the most northerly latitude reached by the Shuttle. However, the beginning of its twenty-third, twenty-fourth and twenty-fifth orbits, it was flying, in a due easterly direction changing gradually towards south-easterly,

passed in a region some 1400 to 2000mi to the south of the incident area. A discreet distance, but amply close to involve the Shuttle in its command, control, and communications role in the conducting of the extended intelligence operation with sea, land, air and space involvement.

Or, to put it another way, if the US had planned a large scale intelligence operation of this kind, the planners would have been grossly remiss to have neglected an opportunity to gain operational experience with the Shuttle in one of its designated military functions, even if, at this early stage of Shuttle exploitation, its involvement was experimental and not vital. It is possible that, in its orbital passes to the south of the Soviet Union, it would have been advantageously placed to eavesdrop electronically on emergency communications streaming east and west across the USSR between the Far Eastern Command and the centre of political control in Moscow; and presumably, to form and pass on an instantaneous assessment of the way the political situation was developing. How important this kind of role might be if nuclear war were looming.

It is worth looking at the Shuttle passes in greater detail. The first would have occurred with the most northerly point of the orbit, at  $28\frac{1}{2}^\circ$  north latitude, just to the south of Japan, at about  $133^\circ$ E. The Shuttle would have passed through this point at 15.44 GMT on August 31, at the beginning of its 23rd orbit, at a time when the Korean flightpath of the airliner was converging with that of west-

the preparatory stage of the exercise. The Ferret had already made its first pass, over the Bering Sea. The airliner approached the Kamchatka coast at 16.30 GMT, as the Ferret was making its second pass, over the Sea of Okhotsk. This time is given as exactly the moment when intrusion into Soviet airspace began. The Shuttle's second appearance came when the aircraft had completed its passage across the Kamchatka peninsula and had started to cross the Sea of Okhotsk, temporarily leaving Soviet airspace behind. The Shuttle flew east and slightly south across the East China Sea to the north of Taiwan, at about 17.16 GMT. This was about halfway between the first and second intrusions: the mid-point of the operation.

## Delayed launch

The final, fatal phase began as the Korean airliner approached its next Soviet landfall, at 18.05 GMT on Southern Sakhalin, co-ordinated once again with the orbit of the Ferret, which at this moment was to the south of Yakutsk and travelling towards Korea. To pass over Southern Sakhalin, the airliner had to deviate somewhat on to an approximately due west heading. There must have been confidence that the airliner would survive, and therefore presumably continue its flight to Seoul, where it might arrive towards 20.00. According to this calculation, it would complete its passage across Southern Sakhalin, turn again on to a south-westerly heading, and so depart from Soviet airspace by about 18.40. This is when the Shuttle would appear for the third time. At 18.51, beginning its twenty-fifth orbit, it flew over the East China Sea in the region of Taiwan on a course somewhat south of east. In other words, just after the final stage would have been completed. It must have been a strangely empty moment. The focus of attention was no longer there. Would it have already been known what had happened?

The Soviet Union had apparently reacted in relaxed fashion to the Kamchatka intrusion. By its own account it scrambled its interceptors at 16.37 — seven minutes after penetration of its airspace — and discontinued the interception at 17.08 when Kamchatka had been cleared. It displayed keener concern as Sakhalin was approached. Six interceptors were scrambled at 17.42 — twenty-three minutes before the Korean airliner, by turning west, re-entered Soviet airspace. It therefore did so with a sizeable escort repeatedly attempting to contact it on the international emergency frequency of 121.5MHz, and the outcome if it failed to respond to these and other efforts at communication could be in little doubt. Even so, the aircraft was effectively allowed to complete the crossing of Southern Sakhalin. This took 19 min and the aircraft was attacked at 18.24, north east of Pravda. It must be asked whether the Soviet Union did not make difficulties for itself in delaying for so long. The airliner came down at 18.38, so far out to sea that essential operations to examine wreckage for whatever clandestine equipment might have been carried became an arduous task of deep-sea recovery in competition with the USA.

Reverting to the Shuttle, it is interesting to note that the pre-announced time of launch was 06.15 GMT on August 30 and that rain delayed the actual launch until 06.32, that is for 17 minutes. If the plans for the Shuttle as a communications, command and control post called for in-orbit situation reviews, as surmised above, 1) just before, 2) at the mid-

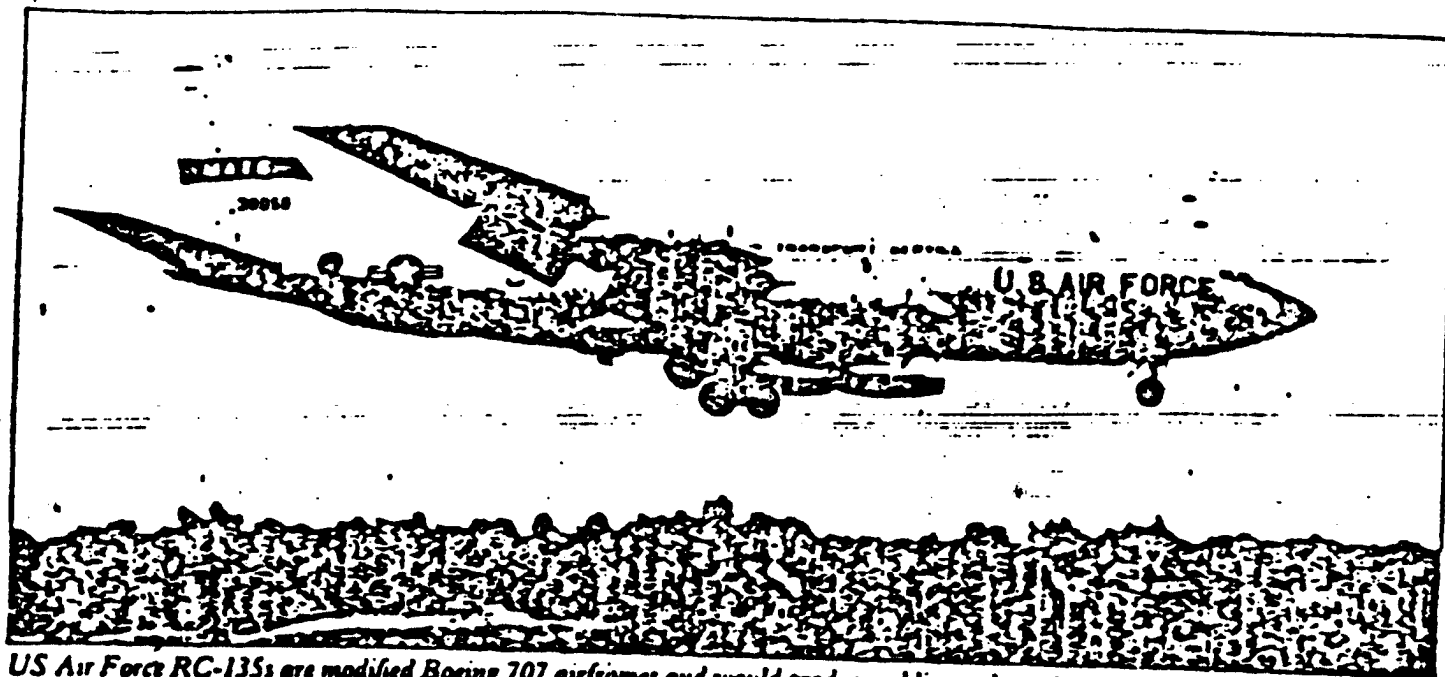
achieved these objectives. The earlier launch time would equally have done so, and would have provided tighter co-ordination with the exits from Soviet airspace marking stages 2) and 3). For example, at the end the Shuttle would have appeared at 18.34, about ten minutes after the expected passage off Sakhalin, rather than 27 minutes as was the case. Obviously, critical timings throughout the operation are geared to the Ferret orbit. This determines key approaches within a minute or less. The Shuttle role accommodates less critical co-ordination.

The necessity of imposing a countdown hold in conditions of high humidity seems genuine. The Shuttle external tank holds cryogenic propellants, including liquid hydrogen, and despite the precaution of spray-on foam insulation, tends to ice up. The launch control has to be satisfied that in given conditions this tendency will not become excessive. One might conjecture that for purely military purposes, when speed in mounting a launch and exact orbital timing may be crucial, more manageable propellants would be preferable.

Three further points are worth attention. The first is that by adjusting one parameter only of the Shuttle's orbit, that is by increasing the orbital inclination, the Shuttle could have been brought directly over the incident area at stages 1), 2), and 3) as described. No doubt this would have been impossible to view as anything other than a flagrant involvement, and the role of the Shuttle did not demand this degree of proximity. The second is that the Soviet Union cannot have failed to observe the relationship of the Shuttle's flight path to the development of the intelligence operation. It was fully alert to the military possibilities of the Shuttle, as a Tass statement coinciding with the launch made clear: it claimed that one of the crew's tasks was to help the Pentagon replace "spy-satellites". It is interesting, therefore, that in the great volume of apparently highly factual material and analysis subsequently published by the Soviet Union there has been no further reference to the Shuttle. The question of Shuttle involvement is in some ways a specially sensitive one, and it could be that the Soviet Union considered it a valuable finesse to withhold it from the immediate debate. The third is that the launch time had been set about one month in advance, and other relevant aspects of this particular Shuttle mission even earlier, which begins to give a timescale for the gestation of the intelligence operation.

A diplomatic situation suddenly arose which neither party can have desired. That the US planners did not seriously credit the possibility of the Korean airliner being brought down tragically underlines the dangers of miscalculation. There had been previous intelligence-inspired incidents involving civilian aircraft, in all of which the aircraft had survived, and it might have been thought that they had confirmed the protected status of civil aircraft caught in suspicious circumstances.\* The US President seemed to be implying this in a broadcast beamed to the Soviet people, when he appeared to undertake that in no circumstances would the US shoot down a Soviet civil airliner. However, the President was handling a political crisis which could well have spelt political disaster for himself and his party, if in the immediate emotional reaction there had mingled any suspicion of US complicity.

\*The closest comparison to KAL 007 is the South Korean airliner which made what is perhaps euphemistically



*US Air Force RC-135s are modified Boeing 707 airframes and would produce a blip on the radar screen similar to 747s*

He had therefore to take swift action to hane the albatross publicly round the neck of the Soviet Union, at whatever cost in embittered relations. He had to lean heavily on the diplomatic convention which permits a degree of falsehood about intelligence operations. And he had to consider whether one or more of his principal counsellors had erred, balancing the disastrous outcome of the operation with whatever compelling necessity may have existed for attempting it. It was perhaps significant that the National Security Adviser, reputedly the second most powerful man in the US, and at that time a family friend of the President, was relieved of his office and transferred to another post six weeks later.

### Secret accord?

Even so, the prospects for keeping the matter indefinitely cloaked in secrecy could never have seemed strong. So many people would have been involved and aware of their individual contributions, and there would have been so many leads for investigative journalists to follow up. It is appropriate at this point to revert above all else to the Soviet account, and the observation already made that so little attention has been paid to it, and ask why? It hardly seems the Soviet Union expected instantaneous acceptance. The Kirsanov article in Pravda was too technically detailed to count as a propaganda thrust, and was not presented in this way. What is perhaps principally significant is that the Soviet Union published this construction of the incident for the US Government to consider; if the US recognized it as basically correct, then in diplomatic contacts it would be embarrassed in trying to maintain the bluff that the airliner was not part of an intelligence exercise, whatever posture it might endeavour to preserve in public. The publication of the article would serve to underline a threat to the credibility of the US government, for more disclosure loomed, and more lines of inquiry could be opened up. And considering the astounding pall of US and Soviet governmental silence which rapidly fell over the event and which has been steadfastly maintained, one must wonder if the Soviet

### intelligence-gathering operation.

If there has been a failure in the West, it is on the part of investigative journalism which has not pursued the enquiry with anything like the vigour that might be expected. After all, the shooting down of KAL 007 with heavy loss of life represents the worst single incident in the whole post-World War II record of West-Soviet relations. So long as it remains unapologized and uncompensated for, how can free-speaking peoples accept that the US Government and other Western governments should soft-pedal it in the way that has happened? At the very least, if the US Government has nothing on its conscience, it has handled the public relations and open information aspects abominably badly.

It is in the US itself that the free press should take up the challenge. Perhaps Americans are less inclined to be cynical about the incident than Europeans, but all the more reason why the American press should be determined to find the answers to every question that can be asked. Here are some of those questions.

What happened to the search for the wreckage? Was it discontinued, either by the US or the Soviet Union, or both, simultaneously or otherwise? Both powers have sophisticated underwater detection and recovery equipment which would be well exercised and tested in the operation, so there can be no argument of technical impracticability or undue cost. The wreckage could have important evidence to yield, quite apart from the possible ultimate retrieval of the flight recorder. Do we not owe it to the memory of the 269 people who died to try and establish so far as we can all the circumstances of their fatal flight? The Soviet Union claimed that there were crew members aboard with clandestine rôles, so by implication there must have been clandestine electronic equipment, and the Soviet Union at least must have its own special interest in examining the wreckage. If the US has not bothered to continue its recovery effort, does it know if the Soviet Union has continued?

It would appear from recent accounts that it is still not possible to

*The Shuttle. Mission STS-8's unusual night-time launch led to the co-ordination of its orbital passes with the progressive stages of the KAL 007 incident a day and a half later. A command and communications role could have been intended. Successive passes were about 1400 to 2000mi to the south — a discreet distance, but near enough for the purpose*



normally be expected to complete the record and not, as has been the case here, to leave tens of names in obscurity. It is a simple enough question — who did die on the flight? — and should not be beyond the power of modern investigative resource to answer.

As to the air traffic control authorities which monitored the flight, whether civilian or military, nothing has ever been published to refute the argument that they were in grave dereliction of their duties, either by failing to appreciate the danger to the aircraft, or by reacting lethargically when the danger was realized. This is one of many points that attempted explanations based on genuine navigation error frankly fail to account for. Another major objection is this: a genuine navigational error with fatal results, observed by U.S. intelligence agencies, would have brought forth a different diplomatic reaction. The U.S. would have realized with horror that the Soviet Union had erroneously assumed that the flight was intentional, with grave harm to then current efforts at halting the missile build-up, and the entire diplomatic outlook. The answer would have been to open every door on information about the flight to try and convince the USSR it was mistaken. Recovery of the wreckage and examination of the navigational equipment would have been a vital part of this programme.

The South Korean airline, for its part, should either demonstrate that its pilots were completely misled by their navigational instruments, or accept liability for their professional misbehaviour. That the aircraft should have come down in the exact geographical location that it did is one of the most embarrassing things to explain. This, in turn, raises the question of the present status of the legal claims for compensation filed against such parties as the manufacturers of the aircraft, the manufacturers of the navigational equipment, and the airline. There is, it is

understood, a lawsuit pending against the US government, for failing to act on the information available to it through its intelligence agencies which would have indicated prompt measures to alleviate the danger to the aircraft.

Finally, what is known and what is not known about Shuttle flight STS-8? Within recent months there has been an amazing development in the US. The Department of Defense appears to be questioning the military value of the Shuttle, and preparing to withdraw financial support from it. This is a major reversal of previous policy, and, it would seem, a write-off of the enormous military funding invested in Shuttle development. Had it not been for military support, it is doubtful if the Shuttle programme would ever have matured. It would certainly not have done so with the present number of orbital craft.

Has the Shuttle's inevitably short military record to date really been so unimpressive as to warrant this change of judgement? If Mission STS-8 is to be ranked in this record — and obviously the Soviet Union thought it was, on the evidence of the Tass statement coinciding with the launch — then undoubtedly the launch delay, due to quite unusual meteorological conditions at the launch site, underlined a significant problem. But there would have to be other problems for the US military to become totally disenchanted with such a new plaything.

Perhaps, therefore, yet another question should be asked. If the diplomatic confrontation over KAL 007 was resolved in a secret accord, did an agreement to demilitarize the Shuttle form part of it? It is a concession which may be more acceptable to the US military than might at first appear. And it is certainly surprising that the Soviet Union, having publicly incriminated the Shuttle at the time of STS-8's launch, did not refer to it in the subsequent heated exchanges. It cannot have been overlooked. Was it perhaps held back from the public